

## *Ekleptostylis heardi* (Diastylidae), a new cumacean species from South Atlantic waters

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*Abstract.*—A new species of Diastylidae in the genus *Ekleptostylis* was discovered among cumacean specimens collected at two stations in the South Atlantic by the R/V *Eltanin* in 1962. The new species, *E. heardi*, features a smooth, unornamented carapace, a rounded distal process on the basis of the second pereopod of males, and a telson which is shorter than the telsonic somite and which, in males, exhibits a flattened dorsal process strongly produced posteriorly over the terminal part. The characteristic telson process is shared by its only other congener, *E. walkeri* (Calman, 1907) and by the similar *Diastylis pseudinornata* Ledoyer, 1977, which also occurs in the South Atlantic. Both sexes of *E. heardi* differ from the preceding two species and from other similar species of *Diastylis* by the spination of the telson, uropods, and third maxilliped, and by other aspects of the carapace.

We were recently given the opportunity to examine specimens of an unidentified cumacean in the family Diastylidae collected from extreme South Atlantic and Antarctic waters and made available for study by the Smithsonian Oceanographic Sorting Center. Characteristics of the specimens place them in the obscure genus *Ekleptostylis* (Stebbing, 1912) previously reported mainly in the north Atlantic and Mediterranean. The specimens were obtained from two samples collected in December 1962 by the R/V *Eltanin* one from very deep water (3474–3590 m) north of the Antarctic Peninsula, and the other from relatively shallow water (119 m) on the Patagonian Shelf south of the Falkland Islands and east of Tierra del Fuego. Although many other samples were examined from collections made at various depths from these areas, no other specimens of the new species were found. Type specimens of the new species are deposited in the U.S. Museum of Natural History (USNM), Smithsonian Institution, Wash-

ington, D.C.; additional material is deposited in the museum of the Gulf Coast Research Laboratory (GCRL), Ocean Springs, MS.

The cumacean family Diastylidae includes an extensive group of somewhat loosely related genera, most of which, like the type genus *Diastylis*, have two terminal spines on the telson. Among the genera of Diastylidae, the formerly monospecific genus *Ekleptostylis*, has characteristics similar to *Diastylis* except that it has a telson shorter than the telsonic somite (sixth abdominal segment) and similar to *Leptostylis* except that the flagellum of the second antenna of males greatly exceeds the end of the body. Similarities to *Leptostylis* also include the first antenna of males with the third peduncular article bearing a brush-like tuft of setae and the endopods of the uropods being longer than the exopods. Stebbing (1912: 153) erected the genus to include the single species *E. walkeri* (Calman, 1907), formerly of the genus *Leptostylis*, in which the

male has a telson with "a lobe uniquely produced over the narrow distal portion." His meager generic diagnosis induced Fage (1951) to provide a more thorough description of *E. walkerii*, to which he added to the generic diagnosis the important feature of a rounded apical process on the basis of the second pereopod of males. The new species described herein, *E. hardii*, extends the range of this genus to the South Atlantic.

Genus *Ekleptostylis* Stebbing, 1912

*Ekleptostylis hardii*, new species

Figs. 1-5

*Holotype*.—Adult non-ovigerous (incubatory) female (USNM 230401). Type locality: Station 363, 600 km north of Antarctic Peninsula (57°09'S, 58°58'W), 3590 m depth, 7-8 Dec 1962, R/V *Eltanin* Cruise 6.

*Paratypes*.—From same sample: 1 male, damaged, P1 removed, abdominal half missing (USNM 230402); 8 males, 11 ovigerous females, 10 subadult females, 7 juveniles (USNM 230403); 1 ovigerous female, remnants of dissection (USNM 230404).

*Additional material examined*.—Station 344, 500 km east of Tierra del Fuego (54°04'S, 58°46'W), 119 m depth, 4 Dec 1962, R/V *Eltanin* Cruise 6: 6 males, 10 incubatory females, 8 ovigerous females (GCRL 1372).

*Description of adult incubatory female*.—Total body length 5.7-8.5 mm (17 individuals measured, mean = 7.3 mm). Carapace (Fig. 1D, E) less than 1.5× longer than deep, greater than 1.5× longer than broad, with fine granular ornamentation. Antennal notch well developed. Anterolateral margin of carapace finely serrate immediately posterior to antennal notch. Pseudorostrum moderately produced, frontal lobe broad; ocular lobe small, eyes absent. Thorax approximately 0.4× carapace length; all segments visible dorsally; fifth segment narrow, with rounded posterolaterally produced corners. Cephalothorax about 0.8× length of abdomen.

First antenna (Fig. 2A): First article of peduncle stout, approximately same length as second and third articles combined, with large plumose seta at distal end; third article longer and narrower than second. Main flagellum with 3 articles; article 2 with 2 multiarticulate aesthetascs emerging from near distal end, aesthetascs approximately as long as 3 flagellar articles combined. Accessory flagellum less than half length of main flagellum, with 3 articles; second article longer than other 2 combined; third article with 2 aesthetascs and 1 hair seta of approximately equal lengths at distal end; seta shorter than combined articles of flagellum.

Second antenna (Fig. 2B): composed of 2 articles, first slightly longer than second. First article with stout plumose seta at distal end; second article with long plumose seta emerging at mid-length, short plumose seta at distal end. Total length of second antenna approximately one third length of first antennal peduncle.

Mandible (Fig. 2C): Large, boat-shaped, with well-developed pars molaris and pars incisiva, latter with 4 teeth; well-developed lacinia mobilis on left mandible, with 3-4 teeth. Each mandible bearing 11-13 plumose setae between incisor and molar processes, with small recurved spine at proximal end of setal row.

First maxilla (Fig. 2D): 2 endites twice as long as broad; smaller endite with 4 thick and 1 slender distal setae. Palp with 2 distal setae (filaments) of equal length.

Second maxilla (Fig. 2E): 2 endites slightly longer than broad, each with 3-4 distal pectinate spines. Setose lateral (flagellum exopod) with short, 2-articulate palp at distal end.

First maxilliped (Fig. 3A): Composed of 6 articles; basis broad, longer than remaining articles combined, with row of 5 short plumose setae on inner margin. Endite with specialized structures consisting of 3 curved spines, 1 tri-dentate spine, 2 coupling hooks, and 2 plumose setae located near base. Ischium short, wider than long,

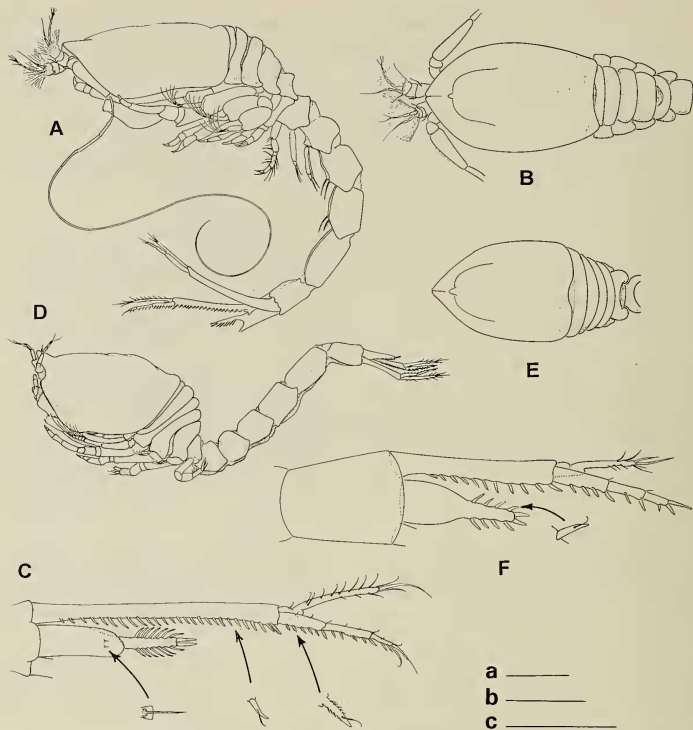


Fig. 1. *Diastylis heardi*, n. sp. Male: A, lateral view of whole animal; B, dorsal view of cephalothorax; C, telson and uropod, dorsal view, insets showing spinal detail. Female (incubatory): D, lateral view of whole animal; E, dorsal view of cephalothorax; F, telson and uropod, inset showing spinal detail. Scales: a = 1.0 mm (A, B, D, E); b = 0.5 mm (C); c = 0.5 mm (F).

with 2-3 short plumose spinules on distal third of inner margin; outer margin naked. Merus, inner margin with 2 rows of denticulate spines and hair setae, distally with short plumose seta and 2 partially fused plumose setae on inner and outer margins respectively. Carpus inner margin with row of fine hair setae; outer distal margin with 1 apical and 1 subapical long plumose setae, 1 subproximal simple seta, 2 comb setae adjacent to base of propodus. Propodus

with thick distal spine setae and 2-3 simple setae. Dactylus in the form of a thick spine approximately same length as propodus.

Second maxilliped (Fig. 3B): Composed of 6 articles; basis slightly less than half total length of appendage, distal end with 4 large plumose setae on inner margin, 3 stout hair setae near outer margin. Ischium with 2 large plumose setae on inner margin. Merus with 7 stout plumose setae on inner margin, 3 longer plumose setae on outer

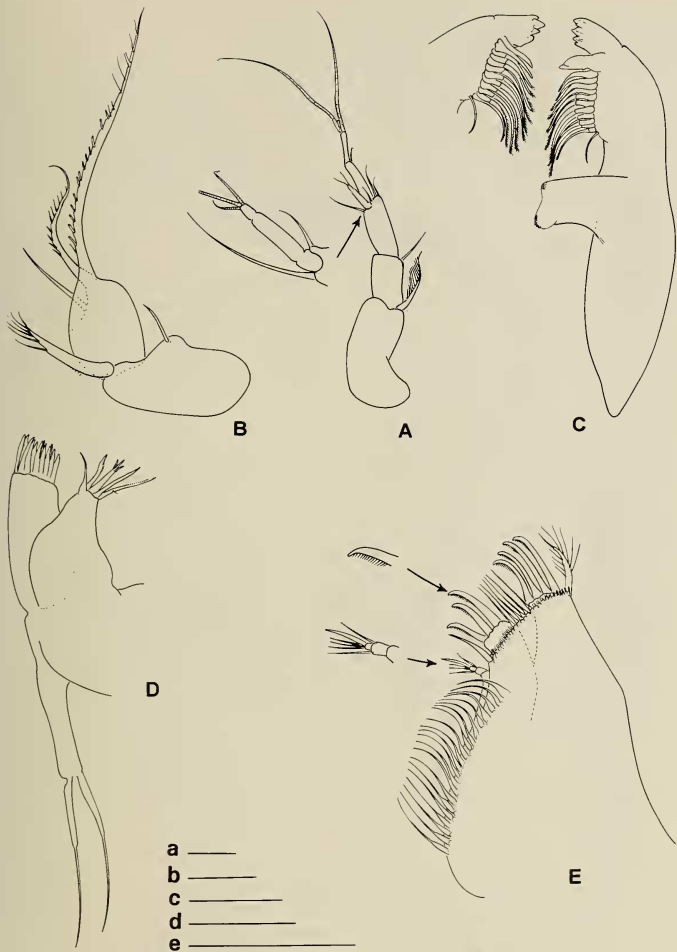


Fig. 2. *Diastylis heardi*, n. sp. Incubatory female: A, first antenna, inset showing accessory flagella; B, second antenna; C, mandibles; D, first maxilla; E, second maxilla, insets showing pectinate spine detail and palp. Scales: a = 0.1 mm (C); b = 0.1 mm (D); c = 0.1 mm (E); d = 0.1 mm (B); e = 0.5 mm (A).

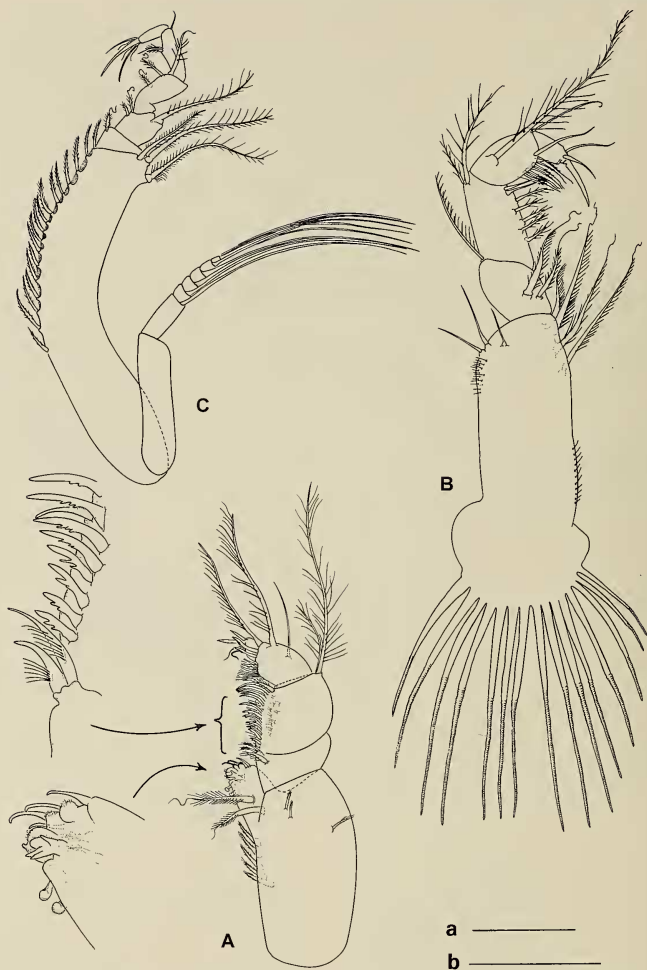


Fig. 3. *Diastylis heardi*, n. sp. Incubatory female: A, first maxilliped, insets showing denticulate spines on carpus and detail of endite; B, second maxilliped; C, third maxilliped. Scales: a = 0.2 mm (A, B); b = 0.5 mm (C).

margin, 1 at proximal end and 2 at distal end. Carpus with 1 large mesial plumose seta near proximal end, row of small plumose setae on inner margin, 2 hair setae, 1 at each distal corner. Propodus shorter than carpus, with 2 hair setae at distal end. Dactylus in form of strong spine, bent back toward base of appendage; length exceeds that of propodus. Oostegite rudimentary, with 15–17 setae, each with annulations on distal half. All plumose setae end in coiled filaments.

Third maxilliped (Fig. 3C): Basis over twice length of remainder of appendage, curved, with 17 short plumose setae on exterior lateral margin, 3 large plumose setae at distal end of interior margin. Ischium short, wedge-shaped, inner margin with one short, plumose distal seta. Merus about as long as wide, with large, plumose distal seta on outer margin, 2 short, plumose distal setae on inner margin. Carpus approximately as long as ischium and merus combined, with 3 short plumose setae on distal half of inner margin. Propodus approximately as long as carpus, with 2 small plumose setae on middle of inner margin, 1 small hair seta on outer distal margin. Dactylus shorter than propodus, terminating in 1 long spine and several simple setae. Exopod composed of single peduncular article and 6-articulate flagellum, each flagellar article with 2 terminal setae.

First peraeopod (Fig. 4A): Basis curved nearly 90 degrees, approximately  $0.7\times$  length of remaining articles, lateral margins heavily setose on distal half. Propodus nearly as long as ischium, merus, and carpus combined. Dactylus approximately same length as ischium and merus combined, terminating with 3 thick simple setae. Exopod flagellum with 8 articles, otherwise similar to that of third maxilliped, approximately as long as basis of endopod.

Second peraeopod (Fig. 4B): Smaller than first peraeopod. Basis slightly curved, approximately as long as next 3 articles combined. Ischium very short, wedge-shaped. Carpus with 2 stout spines at distal

end. Propodus with 1 stout spine at distal end. Dactylus with 3–4 thick terminal setae. Exopod longer than basis, otherwise similar to that of in peraeopod 1.

Third and fourth peraeopods (Fig. 4C, D): Basis long, straight, similar in both appendages except longer than remaining articles combined in peraeopod 3 and about  $\frac{2}{3}$  length of remaining articles combined in peraeopod 4. Ischium + merus equal to carpus + propodus in length. Exceptionally thick setae at distal ends of carpus (2) and propodus (1). Dactylus terminates in large stout spine twice as long as dactylus. Exopod rudimentary, with 2 articles.

Fifth peraeopod (Fig. 4E): Similar to peraeopods 3 and 4 except relatively shorter; basis about half length of remaining combined articles. Carpus and propodus each with single exceptionally thick seta, overreaching terminal spine of dactylus. Without exopod.

Telson and uropods (Fig. 1F): Telson  $0.89\times$  length of telsonic somite (6th abdominal segment),  $0.75\times$  length of uropodal peduncles; with 2 terminal spines, 4–5 pair of lateral spines. Peduncles with 11 lateral spines. Exopods 2-articulate, with nearly imperceptible articulation formed by 2 deep notches proximally, on dorsal and lateral margins. Endopods 3-articulate, bearing 4, 2, and 2 spines respectively in proximal to distal articles, entire endopod longer than exopod. Both rami terminate in a long spine. Each lateral spine on telson, peduncles and endopods with sub-terminal hair seta.

*Description of mature male.*—Males are distinctly sexually dimorphic from females in the following respects:

Total length 7.5–9.1 mm. (9 individuals measured, mean = 8.5 mm.) Carapace (Fig. 1A, B)  $2.5\times$  longer than deep,  $1.5\times$  longer than broad. Antennal notch absent. Thorax approximately  $0.5\times$  carapace length; all segments visible dorsally; first segment reduced to narrow band, lateral margins obscured, overreached by carapace and anterolateral corners of second segment; pos-

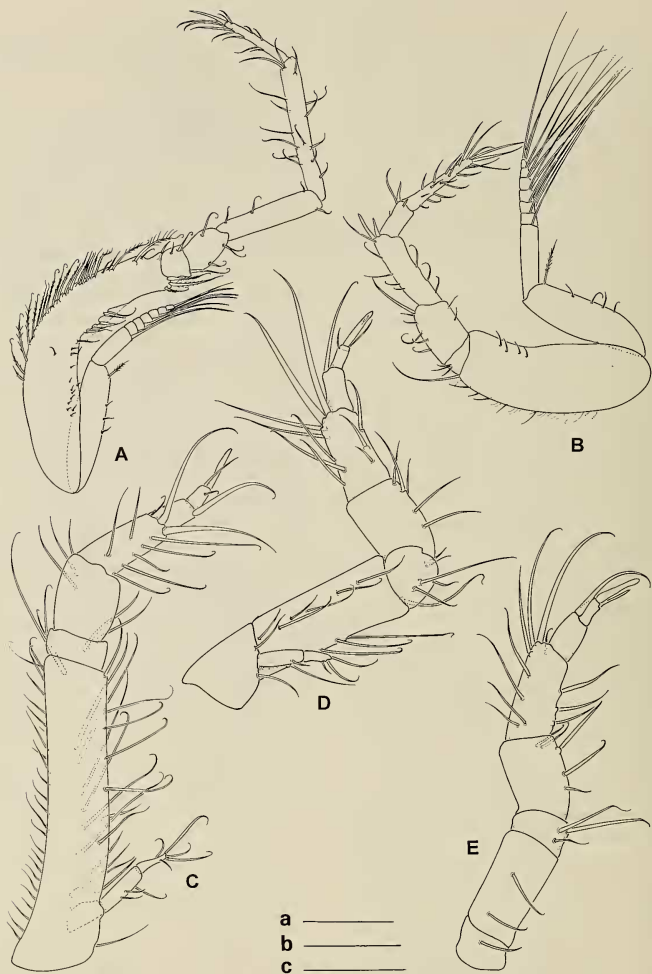


Fig. 4. *Diastylis heardi*, n. sp. Incubatory female: A, first pereopod; B, second pereopod; C, third pereopod; D, fourth pereopod; E, fifth pereopod. Scales: a = 0.25 mm (C, D, E); b = 0.5 mm (A); c = 0.5 mm (B).



terolateral margins of segments 2–5 produced, visible dorsally. Cephalothorax about  $0.8\times$  length of abdomen.

First antenna (Fig. 5A): Third article with conspicuous, thick brush-like tuft of hair filaments surrounding flagella, 2-articulated accessory flagellum terminating in long hair seta, 5-articulated main flagellum terminating in 3 multiarticulate aesthetascs.

Second antenna (Fig. 5B): First and second articles with 1 and 2 plumose setae respectively. Fifth article wide, tapering distally, longer than preceding four articles combined. Flagellum long, extending past ends of uropods.

Peraeopods (P1—Fig. 5C; P2—Fig. 5D): Exopods present on peraeopods 1–5; endopods and exopods with inflated bases; otherwise similar to female except peraeopod 2 with conspicuous apical rounded process on basis and distal plumose seta on first article of exopod flagellum.

Abdomen: Pleopods (Fig. 5E, F) present on first and second segments; third and fourth segments with pleopods replaced by single plumose setae.

Telson and Uropods (Fig. 1C): Telson  $0.69\times$  length of telsonic somite,  $0.54\text{--}0.59\times$  length of uropodal peduncles; with 2 terminal spines, 5–7 pairs of lateral spines; with flattened dorsal process strongly produced posteriorly over the terminal part; with pair of ventral anal valves. Dorsal process with row of closely spaced “scales” on lateral margin, extending from base of telson, around end of process and back to base; scales pointed near base of process, becoming rounded at distal end. Pair of small, slender spines located near distal end of process lying flat against dorsal surface (see inset, Fig. 1C), each with pair of short, broad companion setae situated laterally at base. Uropodal peduncles  $1.6\times$  length of exopods, with 20–27 medial spines. Endopods with 3 articles, with 6–8, 4–5, and 2–3 medial spines respectively. Exopods slightly shorter than endopods; 2-articulated with proximal notches as in female. Spines toward distal end of peduncle and on en-

dopod barbed, possessing hair setae as in female.

*Distribution.*—Known only from the type locality, north of the Antarctic Peninsula, and from the nearby southern tip of South America.

*Etymology.*—Named for Richard W. Heard in honor of his numerous contributions to the study of Cumacea and other crustaceans.

*Remarks.*—*Ekleptostylis heardi* differs from its congenitor, *E. walkeri* mainly by spination of the telson and uropods. Fage (1951:125) described females of *E. walkeri* as having a telson with 14–15 lateral spines, the uropod peduncle with about 20 lateral spines, and the endopod of the uropod with 7-1-1 spines respectively on its three proximal to distal articles. Conversely, the females of *E. heardi* have 4–5 telson spines, 11 uropodal peduncle spines, and 4-2-2 spines on the three endopodal articles of the uropod. The female telson of *E. walkeri* is about  $0.75\times$  and  $0.47\times$  the lengths of the 6th abdominal somite and uropodal peduncles respectively, whereas in *E. heardi* these proportions are  $0.89\times$  and  $0.75\times$ . The males of *E. walkeri*, while not thoroughly described by Fage, appear to have a telson similar in appearance and spination to that of *E. heardi*; the second peraeopods, however, differ in that the dactylus is much longer in comparison to that of *E. heardi*, being about the same length as the carpus, whereas in *E. heardi*, the dactylus is shorter, about  $0.7\times$  the length of the carpus.

*Ekleptostylis heardi* appears also to be very similar to *Diastylis pseudinornata* Ledoyer, 1977, described from Kerguelen Island, in the far southern Indian Ocean. Ledoyer's description of the male of this species did not mention the second peraeopod nor features of the first antennae. However, his figure 4a shows the brush-like tuft of hair filaments on the third article of the male first antennae and a dorsal telson structure similar to that of *E. heardi*. These characteristics suggest that *D. pseudinor-*



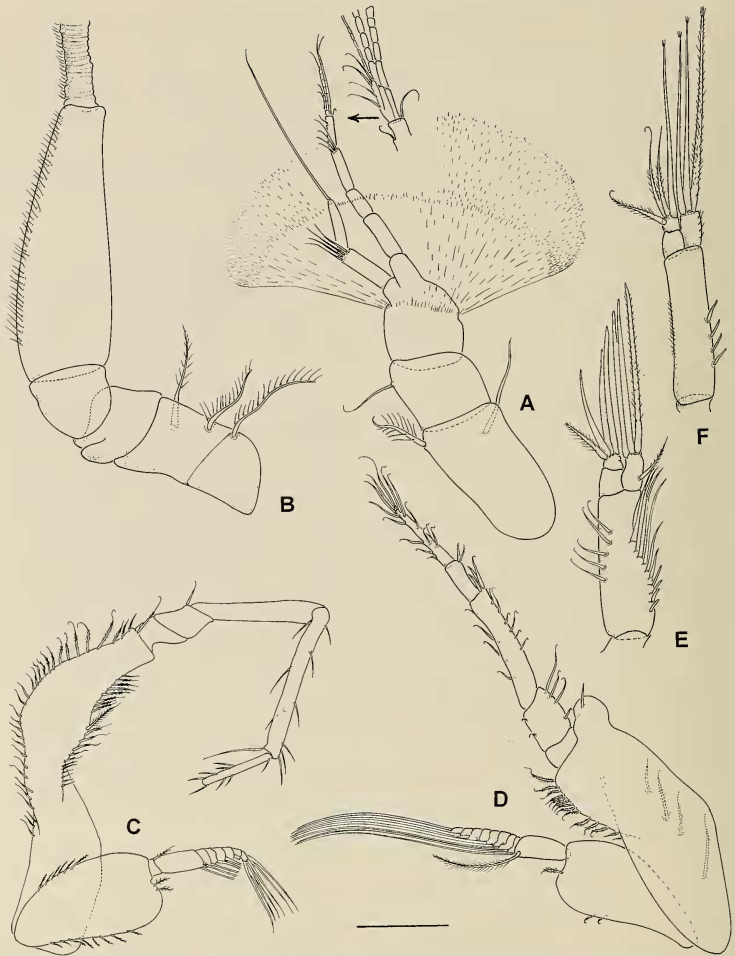


Fig. 5. *Diastylis heardi*, n. sp. Male: A, first antenna, inset showing distal end detail of main flagellum; B, second antenna; C, first peracopod; D, second peracopod; E, first pleopod; F, second pleopod. Scale = 0.25 mm (A, B, D, E, F), 0.5 mm (C).

*nata* may in fact belong in the genus *Ekleptostylis*. The male telson of the two species differ in the number of lateral spines, 3 pairs on *D. pseudinornata*, as opposed to 5–7 pairs respectively on *E. heardi*; no data are given on the male uropod characteristics of *D. pseudinornata*. According to Ledoyer's description, the females of *D. pseudinornata* are also very similar to those of *E. heardi*; however, the first two thoracomeres of the female *E. heardi* lack anterior prolongations, a determining characteristic of *D. pseudinornata*, and the first four articles of the third maxilliped in *D. pseudinornata*, especially the merus, bear 1–3 large teeth, whereas these teeth are lacking in *E. heardi*.

The prominent dorsal process on the male telson of *E. heardi* is also present in *Diastylodes carpinei* as illustrated by Băcescu (1969:164); however this species, from the Mediterranean, differs generically from other members of Diastylidae by virtue of its broad, truncate mandibular base (boat-shaped in *Diastylis* and others).

*Diastylis inornata* Hale, 1937, another similar Antarctic species with a smooth carapace, is distinguished from *E. heardi* by the near absence of an antennal notch and by having fewer (3) lateral telson spines. The male of *D. inornata* is unknown.

Because of the large disparity in depths between the two stations where *Ekleptostylis heardi* occurred (3490 and 119 m), it

is likely that the species is distributed widely in the South Atlantic and Antarctic region.

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